

ENVIRONMENTAL MONITORING AND ASSESSMENT PROGRAM (EMAP) - REGION 10 UPDATE

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www.epa.gov/r10earth/emap.htm

INTRODUCTION

EPA's Environmental Monitoring and Assessment Program (EMAP) is designed to provide tools to monitor and assess the condition of the nation's freshwater and coastal systems. This program was developed by EPA's office of Research and Development (ORD). The goals of EMAP are to develop the strategy and methodology to:

- Estimate the current status, trends and changes in selected indicators of the condition of the nation's ecological resources on a regional basis.
- Estimate the geographic coverage and extent of the nation's ecological resources.
- Seek associations between selected indicators of natural and human stresses and indicators of the condition of ecological resources.
- Provide statistical summaries and periodic assessments of the nation's ecological resources.

The Western EMAP focuses on the aquatic systems and landscape features of the states encompassed by EPA Regions 8, 9 and 10. There are three major components of the Program - Coastal, Surface Waters (rivers and streams), and Landscapes. The Western EMAP is a partnership between EPA and the States. All field data for Western EMAP in EPA Region 10 is or will be collected by the state and tribal environmental agencies. The Western EMAP represents a five-year effort by the EPA to advance the science of ecosystem health monitoring and to demonstrate the application of core EMAP indicators in environmental assessment. This update describes progress to date and future activities related to EMAP.

COASTAL

The coastal component of Western EMAP applies EMAP's monitoring and assessment tools to create an integrated and comprehensive coastal monitoring program of the west coast. Water column measurements, sediment characteristics and chemistry, benthic organisms, and data from fish trawls are combined to describe the current estuarine condition.

Sampling has focused on a different type of estuarine resource each year. The Washington Department of Ecology (Ecology) and the Oregon Department of Environmental Quality (ODEQ) sampled small estuaries in 1999. Oregon sampled a second set of small estuaries in 2001. Sampling of larger systems (Puget Sound, Columbia River Estuary) was completed in 2000. An intensified study of Tillamook Bay, Oregon was also conducted in 1999.

In 2002, samples were collected from the south central coast of Alaska (called the Alaskan Biographic Province), which includes both Cook Inlet and Prince William Sound. The Alaska Department of Environmental Conservation (ADEC) managed this effort with support from the Cook Inlet Regional Citizens Advisory Council (CIRCAC). In Oregon and Washington, the intertidal zone, including low salt marsh, intertidal flats and shallow subtidal habitats of estuaries were sampled in 2002.

Survey of Ecological Conditions of the Western U.S. Continental Shelf

In 2003, NOAA, EPA, and partnering west coast states (WA, OR, CA) combined efforts to conduct a survey of ecological condition of aquatic resources in near-coastal waters along the U.S. western continental shelf.



photo: NOAA Ship McArthur II

This survey involved the cooperation of numerous organizations. NOAA's Marine and Aviation Operations (NMAO) provided the research ship (NOAA R/V McArthur II). Funds for the project were provided primarily by the EPA, Office of Research and Development. Representatives of the NOAA/National Ocean Service's National Centers for Coastal Ocean Science (NCCOS) and National Marine Sanctuary Program (NMSPP) participated on the cruise as members of the scientific staff. The Northwest Fisheries Science Center of NOAA's National Marine Fisheries Service (NMFS) provided field support and analysis of fish pathologies through a cooperative agreement with EPA.

Sampling was conducted at approximately 50 stations along the coast of each western coast state, for a total of approximately 150 stations. This survey provided the data necessary for this first-ever comprehensive assessment of ecological conditions of near-coastal waters (30-120 m depth) along a major portion of the U.S. western continental shelf, from the Straits of Juan de Fuca in Washington State to the Mexican border. The survey included stations in all five of NOAA's National Marine Sanctuaries on the west coast, thus providing an opportunity to assess condition in sanctuaries as compared to non-sanctuary areas of the shelf.

SURFACE WATERS – (Rivers and Streams)

Western EMAP applies tools developed by ORD to monitor and assess rivers and streams across the contiguous western States. Water chemistry, physical habitat, benthic macroinvertebrate, fish, and periphyton assemblage data are combined to describe the current river and stream conditions. Idaho Department of Environmental Quality (IDEQ), Oregon DEQ, Washington Department of Ecology, and the Nez Perce Tribe have conducted most of the sampling for Western EMAP in Region 10, to date.

The Western EMAP surface water component evaluates the ecological condition of rivers and

streams at two scales. The broad scale assessment will allow us to evaluate the overall condition of rivers and streams for each state and the entire region. For this scale assessment, approximately 150 stream sites are in the process of being sampled in Idaho, Oregon and Washington over a 4 to 5 year period, beginning in 2000. Over the same time period, approximately 50 river sites will also be sampled across these three states.

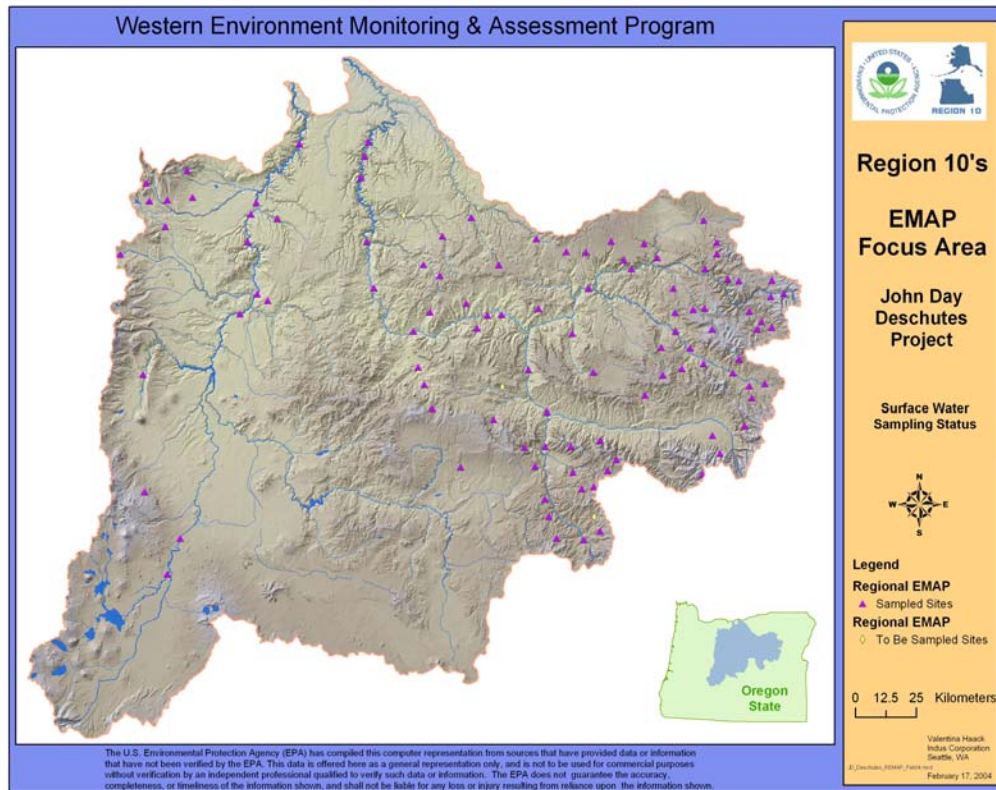
The second scale of evaluation is smaller and more localized. This smaller scale will allow us to more intensively assess particular geographic areas or resource types. These areas will be sampled over the same four year period as the broad scale sample sites. For streams, we will be intensifying the EMAP sampling effort in three focus areas:

- the John Day and Deschutes basins of Oregon (see **Map 1**),
- the Wenatchee Basin of Washington (see **Map 2**), and
- the medium to large sized rivers of Idaho.

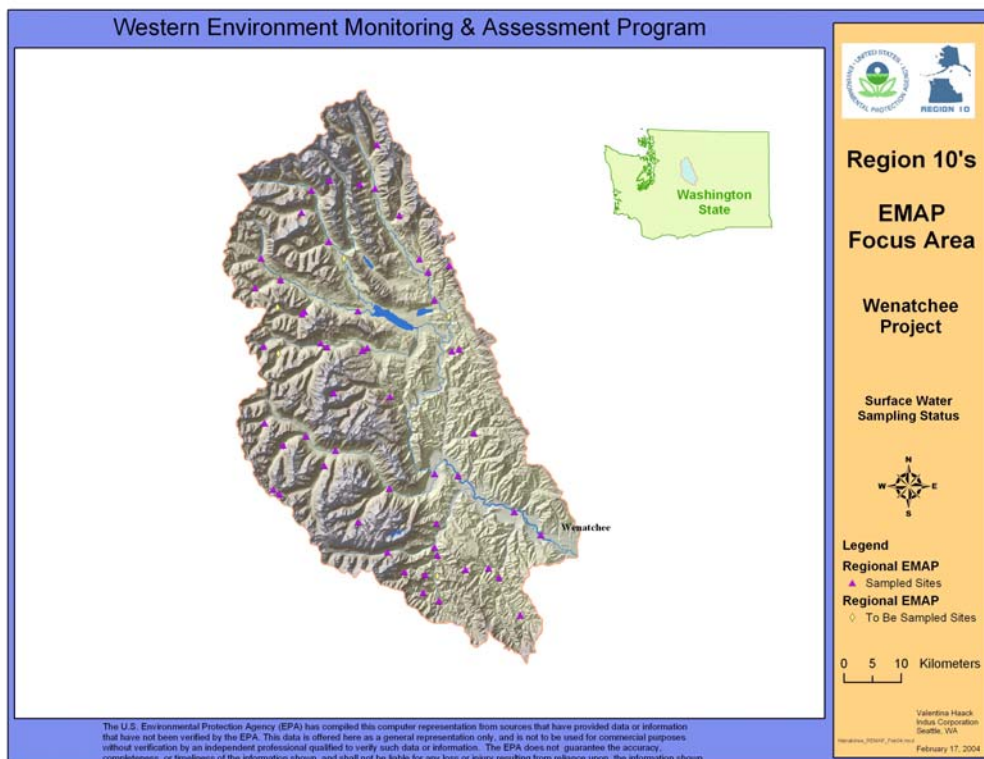
The sampling of the John Day and Deschutes and Wenatchee basins began in 2000. The river sampling in Idaho began in 2002.

During the summer of 2003, as part of the national State Monitoring, Assessment, and Reporting Program Grants, 50 wadeable streams will be monitored in Alaska. Water chemistry, physical habitat, benthic macroinvertebrate and periphyton assemblage data will be collected using EMAP field protocols.

Alaska DEC has selected the Yukon River Lowlands/Yukon Tanana Uplands (Hydrologic Assessment Unit #1904) as the proposed study area. This unit is located in interior Alaska, north of the Alaska Range. It extends from Denali National Park and Preserve at the west to the Yukon Territory border at the east. The project will be managed by Alaska DEC in collaboration with the University of Alaska Environmental and Natural Resources Institute (ENRI), Alaska Cooperative Fish and Wildlife Research Unit and the USGS Alaska office.



Map 1. Sampling sites in the John Day/Deschutes Basins of Oregon.



Map 2. Sampling sites in the Wenatchee Basin of Washington.

LANDSCAPE

Landscape conditions will be assessed using a variety of metrics generated from spatial data. These data have been derived from existing data sources, satellite imagery, and field sampling. They will be combined in a Geographic Information System (GIS) to generate interpretations and assessments for both the coastal and surface water components of Western EMAP. Landscape data will provide environmental managers additional data to identify areas where aquatic resource conditions appear vulnerable to impairment as well as identifying potential areas for resource protection. During 2002 and 2003, the Landscapes team developed a series of databases to be used in conjunction with coastal and inland aquatic resources. Much of this database work is now complete and these data are now being used to develop associations between measures of landscape attributes and measures of aquatic condition. An example of these associations is an attempt to identify areas of potential rangeland grazing impacts to aquatic resources.

In 2002 a full suite of datasets and preliminary landscape analysis for the Western EMAP landscape pilot area in Northwest Oregon was completed. These data and analyses are available on CD and will soon be available via an interactive web browser-based tool. Much of the landscape data is also available for the entire state of Oregon. As the data sets are completed for Idaho, Oregon, and Washington, landscape metrics will be calculated for the various landscape components. A core set of metrics will eventually be developed for each state. In addition, other targeted regions within the Pacific Northwest will have more specific analyses conducted. The goal is to have all the data and analyses produced by the landscape team available via interactive web browser-based tools.

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